

an arbitrary space curve being given, it can be considered as one branch of the flecnodal curve of an infinity of ruled surfaces, into the general expression of which there enters an arbitrary function. On the other hand, two curves taken at random cannot be connected, point to point, so as to be the complete flecnodal curve on the ruled surface thus generated. As the author remarks, there is no doubt that the field thus opened promises valuable results. So far as the analysis goes, it follows the lines of the known theory of differential invariants, constructed by Halphen, Lie, and others.

Finally, Prof. Mason gives an interesting summary of various boundary-value problems of differential equations. Perhaps one of the most elegant things in this essay is the construction of a doubly periodic Green's function  $G$ , which satisfies the equation  $\Delta u = 0$  within the period rectangle, except at two points where it is logarithmically discontinuous. This is followed by a remarkable application to the equation  $\Delta u = f(x, y)$ , where  $f$  is periodic in  $x, y$  independently, with periods  $a, b$  equal to the lengths of the sides of the period rectangle of  $G$ .

It is noteworthy to find the United States maintaining so many distinguished mathematicians, both native, and, if we may be excused the term, imported. When will the English nation wake up to the fact that it is not waste of money, or at best a concession to dilettante ideals, to provide a living for a first-rate mathematician, even if he proposes to devote his life to varieties in  $n$  dimensions, or the theory of aggregates, or the distribution of primes? Surely, and at an accelerating rate, the dominion over nature and over their fellow-men is coming into the hands of the stargazers, the speculators, the originals, who have been lampooned and pilloried from the age of Aristophanes to that of Swift, and from his days to our own. Or rather, the material profit, the worldly dominion, will come to those nations that have the sense to see that by attracting these creators of new ideas they are encouraging every kind of higher invention, and buying in the cheapest market the best of goods—brains.

G. B. M.

#### IMPRESSIONIST ASTRONOMY.

*The Night-Skies of a Year: Being the Journal of a Star-gazer.* By J. H. Elgie. Pp. xii+247. (London and Leeds: Chorley and Pickersgill, Ltd., 1910.) Price 6s. net.

**T**AKING sections for each month of the year as basis, the varying aspects of the constellations are presented in a series of discursive notes purporting to describe the impressions of the writer on the occasions when he observed the various objects. The author takes as his aim the task of teaching the geography of the sky by means of a journal showing how the constellations alter in their relative aspects from night to night, and at different times on any night. So far this is commendable. It is evident, however, that the desire to produce a volume of impressive magnitude has induced the decision to inflict a superfluity of purely personal impressions; if these were in the main likely to be experienced by

other observers, they might be helpful, but from the nature of many of them it is very questionable if they can be. Take as an example the following:—

"Ten o'clock! Ugh! How drear and dismal is the night, a night unrelieved by star or moon. Rain is beginning to fall. The tempting gleam of a brightly burning fire comes out to me through my window, so I will indoors and try to think that this really is the opening of the 'merrie month.' Then, to round off the evening presently, I will study anew an appropriate article on the old, old question of 'Is the climate changing?' If matters do not mend soon I shall alter my opinion on that subject and persist that the climate is changing."

This quotation is a fair sample of the style of the whole, though here and there one finds an oasis of more acceptable material.

The book is illustrated by numerous rough sketches of constellation groups, and if these were not specially intended for instruction they might be passed over. The author specially directs attention to these sketches, and says:—

"I am convinced from the letters of numerous correspondents that the difficulty of recognising the main outlines of the constellations at any hour from the charts accessible to them has damped the enthusiasm of thousands of beginners in the study of astronomy."

Our opinion is, however, that the star alignment diagrams are perhaps the most unsatisfactory feature of the book. Taking any one constellation, even such a well-known one as Orion, for instance, it is shown with the component stars, in different relative groupings on consecutive pages, due, it must be assumed, to defective drawing. We would advise the "numerous correspondents" to purchase a trustworthy star atlas, and endeavour to commandeer the help of a capable friend for about five minutes each week. This would do away with all the damping of their enthusiasm.

#### SNAKES OF CEYLON.

*The Snakes of Ceylon.* By A. F. Abercromby. Pp. vi+89. (London: Murray and Co., 180 Brompton Road, S.W., 1910.) Price 2s. 6d. net.

**T**HE author, being of opinion that the "many works and treatises" in which the snakes of Ceylon are described are "more suited to the scientist than the naturalist," and that "natural history books, on the other hand, seldom give sufficiently detailed information about snakes," has produced a volume which the discerning reader will see at once to be not in the roll of common art. The systematic part being an admitted compilation from well-known works on the fauna of India, we may restrict our inspection to those parts of the book which reveal the originality of the writer.

In dealing with the anatomy and physiology of snakes, the author laments that "the effect of, and antidotes for, snake poison is a subject which has been much written about and much discussed, but very little has been discovered about it." He has heard of permanganate of potash at least, but this, "although a very successful absorbent remedy, is

reported to have a poisonous effect upon the blood." His views on cures for snake-bite are those of a Rip Van Winkle; what we want is—

"not so much a remedy which will absorb and neutralise the poison, as a means by which this neutraliser may be enabled to reach the poison, or a treatment for keeping up the vitality of a patient until the poison becomes absorbed by the system."

In short, he makes the words "absorbed" and "absorbent" as odious as the word "occupy" was to Doll Tearsheet.

In the chapter on "hunting" snakes, our author is as coherent and profound as honest Dogberry himself. The "necessary point" in this hunting to be borne in mind is that "it is less important to go where there are a great many snakes than to go where the nature of the country facilitates seeing and catching of them." So also, "a cobra is best obtained by digging one out of an ant-heap or hole," but "the cobra must have been seen to enter the hole a short time before," for all is vanity. As to smoking a snake out, "it takes a lot of smoke to have any effect on a snake, owing to the latter's lung capacity." The snake has only one lung, but that, like the one eye of Mr. Midshipman Easy's friend, the master's mate, is of prodigious power. When the author tried smoke "it was so suffocating and so blinding that the capture of the snakes was extremely difficult and somewhat risky"; little wonder that he regards it as "an unsatisfactory proceeding." The way to comprehend vagrom pythons "can only be learnt by practice"; but if the python be asleep "it can often be captured without any trouble."

Touchstone and his shepherd could not improve the chapter on snakes in captivity.

"When feeding a tame python great care has to be exercised lest the snake should seize your hand in mistake for a rat, especially if your hand has just been in contact with the latter."

Truly it requires the careful experiments of a natural philosopher to discover

"that cold is not so injurious to these reptiles as is commonly believed, but that it is the infrequency of the sun's rays that renders a climate such as that of England unsuitable for serpents."

Finally, we would commend this weighty precept:

"Those who are desirous of keeping a serpentarium of live snakes should study as much as possible the conditions under which the various snakes live when in the wild state,"

otherwise they labour in vain on their "serpentarium."

#### THE METHODS OF ANTHROPOLOGY.

*The Racial Anatomy of the Philippine Islanders. Introducing New Methods of Anthropology.* By Prof. R. B. Bean. Pp. 236+25 photographs. (Philadelphia and London: J. B. Lippincott Company, 1910.)

THE most recent literature dealing with the study of man's physical characters reveals manifold signs of a widespread revolt against the domination of mere anthropometry in this field of research. It

is often urged that no kind of investigation can claim the title "exact," or even be called "science," unless it deals with evidence that can be expressed in figures or mathematical symbols. But in all biological inquiries a primary sorting of the material is an indispensable preliminary to its mathematical treatment, and until the obviously heterogeneous elements in any series have been sifted, one species of material being separated from another, and males distinguished from females, any attempt to deal statistically with measurements of such unsorted material can produce only confusing and misleading conclusions.

The most urgent need in anthropology at the present time is the determination of those characters of the human body and its parts, which have definite significance as indications of race, and the investigation of the exact value and meaning of such traits, and of the bond of union between them and other distinctive characters, which are associated in groups in different individuals.

The comparative sterility of recent work in anthropology, so far as the determination of racial characters in series of skeletons is concerned, is due mainly to the common neglect of such preliminary studies and the immediate resort to blindly-made measurements as the sole means of investigation. It is the great merit of Sergi's work that he insisted on this return to the ordinary methods of zoological investigation in dealing with human remains, and by the use of such methods, crude and unsatisfactory as some of them undoubtedly are, he has been able to recover a great deal of true history of man's movements, and information concerning his affinities.

Prof. Bean's interesting book on the people of the Philippine Islands claims the consideration of the anthropologist, not so much for what he has accomplished, as from the fact that it is an attempt to direct the investigation of racial anatomy into its proper channel, for in it he has attempted to discriminate between the peculiarities of conformation of the external ear in the different racial elements in the Philippines, and use them as indices of race in precisely the same manner as the zoologist or "the man in the street" would distinguish a cat from a dog, even if these animals were of precisely the same size and quite irrespective of the measurements of their crania or other bones.

Dr. Bean has correlated the various types of ear with a large series of other physical characters, as well as with stature, proportion of limbs and trunk and head; and, like others who have undertaken similar investigations upon man or other living creatures, he finds that "the method of grouping reveals types that apparently represent *character-complexes* composed of unit characters," which "hang together in heredity or break up when crossed with other *character-complexes*."

Throughout the book the author is ever on the alert to detect Mendelian phenomena, and in chapter x. he builds up a scheme for the explanation of heredity in human mixtures.

The most unfortunate feature of Dr. Bean's sug-